

THE ECONOMIC IMPACTS OF THE PORT OF BALTIMORE 2010

Prepared for the:
MARYLAND PORT ADMINISTRATION

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Prepared by:
MARTIN ASSOCIATES
941 WHEATLAND AVE., SUITE 203
LANCASTER, PA 17603
www.martinassoc.net



Maryland Port Administration

Inter-Office Memorandum

TO: File

DATE: December 19, 2011

SUBJECT: MPA comments concerning the Study of Economic Impacts of Port of Baltimore in 2010, by Martin Associates

The MPA commends the excellent work by Martin Associates in completing a comprehensive report of the economic impacts of Port of Baltimore activity for 2010. The report is dated December 16, 2011. There are two methodology changes in the current report compared to historical reports: *induced and indirect related* jobs and a single measure of the *total economic activity*. Although other ports may use these attributes, the MPA chooses not to include them when speaking of the Port's impacts for the following reasons:

- In previous comprehensive studies, only the number of **direct related** jobs was considered. In the current study, the related impacts measure the jobs, personal income, and associated state and local taxes that occur at each stage of production of exports or consumption/use of imported cargo. This includes **induced and indirect related** jobs that are supported by the direct related jobs. The report's inclusion of total related jobs provides a very comprehensive and extremely broad view of the economic impact of the cargo moving via the Port of Baltimore. Upon further consideration of the report, the *induced and indirect related* jobs are not considered sufficiently linked to Port activity to be included by the MPA when it reports the economic impacts of the Port of Baltimore.
- Also in the current report is a single measure of the total economic activity in the State that is generated by maritime activity at the Port of Baltimore. Although provided by the comprehensive study, this measure is also not used by the MPA, because it is tied to the total related jobs and it over simplifies the many facets of economic impacts, such as port-generated jobs, revenues, salaries, taxes, etc.

It should be noted that this report of economic impacts is a "snap shot in time" of the Port's activity in 2010. The Port's cargo volumes and overall activity in 2011 continue to trend up from the recession.

Attached is a summary of the economic impacts to the State of Maryland from activity at the Port of Baltimore during 2010.



TOTAL ECONOMIC IMPACTS GENERATED BY THE PORT OF BALTIMORE

(December 2011)

Periodically, the Maryland Port Administration updates the economic impacts of the Port of Baltimore on the Baltimore region and the State of Maryland. The economic impacts measured for cargo and cruise activity are as follows:

- **Approximately 40,040 jobs in Maryland are generated by port activity.**
 - **14,630** are **direct jobs** generated by cargo and vessel activities at the Port. Examples include jobs with railroads, trucking companies, terminal operators, cargo handling (International Longshoreman Association), manufacturing, towing, pilots, ocean carriers, agents, etc.
 - **14,470** are **induced jobs**, i.e. jobs supported by the local purchases of goods and services by direct employees. These jobs would be lost in the short term if the direct jobs were lost. Examples include sales clerks, mechanics, teachers, government employees, etc.
 - **10,940** are **indirect jobs**, i.e. jobs supported by the business purchases of the employers who create the direct jobs. These jobs, too, would be lost in the short term if the direct jobs were lost. Examples include those who provide office supplies and equipment, utilities, communications, repair, legal and financial services, etc.
- **The Port of Baltimore is a major source of personal and business revenues in the State of Maryland.**
 - The Port was responsible for **\$3.0 billion in personal wage and salary** income.
 - The Port generated **\$1.7 billion in business revenues**.
 - The Port generated **\$1.0 billion in local purchases**.
 - Activities of the Port generated **\$304 million in state, county and municipal tax revenues**.
- **Approximately 68,300** other jobs in Maryland are directly **related to activities at the Port**. Related jobs are those jobs with Maryland companies that chose to import and export their cargo through the Port of Baltimore, but they have the option of shipping their products or supplies (e.g. containerized items, autos or steel products for construction) through a number of other ports. These companies (e.g. manufacturing firms, distributors, coal mines, automobile dealers, etc.) benefit from having a healthy port nearby in Baltimore to assist their logistics. If the Port of Baltimore were not available to them, these firms could suffer an economic penalty over the longer term, but would likely survive by shipping through another port. Note: Although the number of related jobs is high, this category of impact is much less dependent upon the Port than the impacts that are generated by the direct, induced and indirect jobs.
- Combining direct, induced and indirect jobs with related jobs, there are over **108,000 jobs linked to the Port**.

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EXECUTIVE SUMMARY

The Port of Baltimore consists of public marine terminals owned by the Maryland Port Administration as well as private marine terminals. The public marine terminals include the Seagirt Marine Terminal, Dundalk Marine Terminal, South Locust Point Marine Terminal, the North Locust Point Marine Terminal, Hawkins Point and the Masonville/Fairfield Terminal area. These terminals handle general cargo commodities including containerized cargo, automobiles and other roll-on/roll-off cargo, forest products and other breakbulk cargoes such as iron and steel and palletized cargo. The private marine terminals include the Curtis Bay Coal and Ore Pier, the Consolidation Coal Pier, the Chesapeake Terminal, the Atlantic Terminal, Rukert Terminals Corporation and Canton Marine Terminal. Except for the Chesapeake and Atlantic Terminals located in the Masonville/Fairfield Terminal area, which handle automobiles, the other private terminals handle bulk cargoes, steel and metals and a small amount of container and breakbulk cargo. In 2010, these public and private marine terminals in the Baltimore Port District handled more than 40 million tons of international and domestic cargo for exporters and importers located within the State of Maryland, as well as throughout the United States. It is the purpose of this study to quantify the economic impacts generated by the cargo and vessel activity at these marine terminals.

In addition to the economic impacts generated by cargo activity handled at the public and private marine terminals at the Port of Baltimore, the Maryland Port Administration has developed a successful cruise business since the opening of the Cruise Maryland Terminal in 2006. The Port is currently served by two of the world's top cruise lines: Carnival and Royal Caribbean on a year-round basis. A separate report of the economic impacts of cruise activity was conducted by Martin Associates in 2009 and updated for 2010 cruise season, and these impacts are included in this summary of the overall economic impacts of the Port of Baltimore.¹

¹ The Economic Impacts of the 2009 Cruise Season at the Port of Baltimore, conducted by Martin Associates for the Maryland Port Administration, March 4, 2010

THE ECONOMIC IMPACTS OF THE PORT OF BALTIMORE, 2010

Exhibit 1 Summary of the Economic Impacts of the Port of Baltimore

	PUBLIC TERMINALS	PRIVATE TERMINALS	CRUISE	TOTAL
JOB				
DIRECT	6,446	7,961	219	14,627
INDUCED	6,131	8,156	186	14,474
INDIRECT	2,760	8,077	100	10,936
TOTAL	15,337	24,194	505	40,037
PERSONAL INCOME (MILLIONS \$)				
DIRECT	\$349.6	\$452.2	\$8.2	\$810.0
RE-SPENDING/LOCAL CONSUMPTION	\$775.6	\$1,003.2	\$18.7	\$1,797.4
INDIRECT	\$117.7	\$308.3	\$3.3	\$429.3
TOTAL	\$1,242.9	\$1,763.6	\$30.2	\$3,036.7
BUSINESS REVENUE (MILLIONS \$)	\$699.9	\$941.8	\$68.6	\$1,710.3
LOCAL PURCHASES (MILLIONS \$)	\$276.6	\$713.4	\$3.9	\$993.8
STATE & LOCAL TAXES (MILLIONS \$)	\$124.3	\$176.4	\$3.3	\$303.9
RELATED USER IMPACTS IN-STATE				
RELATED IMPACTS				
JOB				
DIRECT	64,102	4,235	NA	68,337
INDUCED/INDIRECT	128,204	8,470	NA	136,674
TOTAL	192,307	12,705	NA	205,012
PERSONAL INCOME/WAGES (MILLIONS \$)				
DIRECT	\$4,156.7	\$849.9	NA	\$5,006.7
INDUCED/INDIRECT	\$5,195.9	\$1,062.4	NA	\$6,258.4
TOTAL	\$9,352.7	\$1,912.4	NA	\$11,265.0
BUSINESS REVENUE/VALUE OF OUTPUT (MILLIONS \$)				
DIRECT	\$19,257.4	\$527.7	NA	\$19,785.1
INDUCED/INDIRECT	\$21,760.8	\$596.3	NA	\$22,357.2
TOTAL	\$41,018.2	\$1,124.1	NA	\$42,142.2
STATE/LOCAL TAXES (MILLIONS \$)				
DIRECT	\$415.7	\$85.0	NA	\$500.7
INDUCED/INDIRECT	\$519.6	\$106.2	NA	\$625.8
TOTAL	\$935.3	\$191.2	NA	\$1,126.5

Totals may not add due to rounding.

In 2010, cargo and cruise activity at the public and private marine terminals in the Port of Baltimore generated 40,037 direct, induced and indirect jobs:

- 14,627 are **direct** jobs. These jobs are generated by activities at the Port, and if such activities should cease, the jobs would be discontinued over the short term. It is these

jobs that are most directly dependent upon the Port of Baltimore. The direct jobs are with the International Longshoremen's Association, terminal operators, stevedores, trucking firms, railroads, steamship agents, freight forwarders and customhouse brokers, warehousemen, federal and state government agencies, towing companies, pilot organizations, and marine construction companies, etc. The majority, about 60%, of the direct jobs are held by residents of the City of Baltimore and Baltimore County.

- 14,474 are **induced** jobs, or those jobs supporting the local purchases made by the 14,627 individuals holding the direct jobs due to port activity. Should the direct jobs be lost from the economy, the induced jobs supported by the purchases of the direct jobs would also be lost. Jobs with local grocery stores, retail outlets, restaurants, transportation services, local government services, schools and hospitals are examples of induced jobs.
- The firms' dependent upon the Port of Baltimore made \$994 million of local purchases for office supplies, equipment, utilities, communications, maintenance and repair services, transportation services, professional services and goods and services. These purchases supported 10,936 **indirect** jobs in the Maryland economy.
- In addition to the direct, induced and indirect job impacts, the Port activity supports 205,012 jobs within the state that are **related** to the Port of Baltimore. Of these 205,012 related jobs, 68,337 jobs are directly related to the cargo moving via the Port of Baltimore, while the balance, 136,674 jobs are indirect and induced support jobs. The direct related jobs are held by employees of the firms exporting and importing cargo through the Port of Baltimore and include such varied entities as manufacturing firms, coal mines, and automobile dealers. In addition, the related jobs include the induced and indirect jobs created at each level of production that are related to an imported product (through the Port of Baltimore) used as an intermediate input in a manufacturing activity, as well as the jobs created at each level of activity to produce an export product moved via the Port of Baltimore. For consumer imports, the related jobs include all jobs and economic activity that are required to the point of final sale. These jobs are considered to be **related** to activities at the Port, but the degree of dependence on the Port is difficult to estimate and should not be considered as dependent on the port as are the direct, induced and indirect jobs. If the Port of Baltimore were not available to these organizations, they would suffer an economic penalty over the longer term. Such a penalty would vary from a loss of employment opportunities in some cases to an increase in total transportation costs in other cases, which could, in turn, result in employment reductions and corporate relocations.

The port activity generated \$3.0 billion in personal wage and salary income for Maryland residents.

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- The 14,627 directly employed individuals received \$810.0 million of personal wage and salary income, for an average salary or wage of \$55,370.
- As the result of the multiplier effects of using a portion of this income for local purchases, \$1.8 billion in induced income and local consumption expenditures were created in the state.² Those 10,936 indirectly employed received \$429.3 million of indirect income.

Businesses providing maritime services at the Port of Baltimore received \$1.7 billion of revenue.

- The \$1.7 billion of revenue received by the businesses providing the services at the Port does not include the value of the cargo moving over the marine terminals, since the value of the cargo is determined by the demand for the cargo, not the use of the Port of Baltimore. It is to be emphasized that only the portion of the revenue paid out in direct salaries, in state and local taxes, and for local purchases can be identified as a “Maryland impact”.
- Of the \$1.7 billion, \$810.0 million was paid out in terms of direct salaries to the Maryland residents employed by these firms. It is to be emphasized that the value of sales or output by the directly dependent shippers/consignees is not included in the business revenue impact, even though the direct jobs and personal income with these shippers/consignees is included as a local impact.
- A total of \$993.8 million of in-state purchases were made by the firms directly dependent on the Port of Baltimore. These expenditures supported the 10,936 indirect jobs.

A total of \$303.9 million of state and local tax revenue was generated by Port activity in 2010.

In addition to the direct, induced and indirect impacts, cargo and cruise passengers moving via the Port of Baltimore in 2010 generated \$42.1 billion of related economic activity. This represents the value of the output to the State of Maryland that is created due to the cargo moving via the Port of Baltimore public and private marine terminals. This includes the value added at each stage of producing an export cargo, as well as the value added at each stage of production for the firms using imported raw materials and intermediate products that flow via the marine terminals and are consumed within the state, as well as the revenue generated at each stage of delivery of a consumer import (via the Port) to final sales. Of the \$42.1 billion of

² The re-spending impact includes the local purchases by those directly employed as well as the consumption expenditures. Therefore, the total re-spending impact cannot be divided by induced jobs to estimate induced salary, as this would be an overestimate of personal income.

related economic activity, \$19.8 billion was directly received by the importers and exporters, while the balance was used for the purchase of support goods and services. The majority of these user impacts are associated with imported containerized cargo via the Maryland Port Administration marine terminals. The 205,012 related direct, induced and indirect users of the Port of Baltimore received \$11.3 billion of total wages and salaries. Finally, the cargo activity at the Port of Baltimore generated \$1.1 billion of state and local taxes with the related users.

The total economic value of the Port of Baltimore's marine cargo operations is estimated at \$45.6 billion. The \$45.6 billion is a measure of the economic value of the marine cargo activity at a given point in time, 2010, and consists of the direct business revenue impact generated by marine cargo activity at the public and private terminals, \$1.6 billion, plus the related economic value of \$42.1 billion, and the induced/respending impact generated by the marine cargo activity at the public and private terminals, \$1.8 billion. These components exclude double counting and represent the total economic value of the cargo activity at the Port of Baltimore public and private marine terminals.

Comparison of Economic Impacts – 2006-2010

The last economic impact study conducted for the Port of Baltimore was conducted by Martin Associates in 2007, using 2006 cargo data. Since the last study, the economic recession has had a significant impact on cargo activity at the public and private marine terminals. Between 2006 and 2010, total tonnage at the public and private terminals fell by 59.4 thousand tons overall. The largest tonnage losses occurred with a 2.4 million ton loss of iron ore tonnage, a 1.1 million ton loss of break bulk cargo, a 1.6 million ton loss of petroleum products and an 843 thousand ton loss of other liquid bulk cargo. In addition, paper tonnage handled at the Port was down nearly 290 thousand tons. These significant losses of cargo were offset to a large extent by the nearly 5.1 million ton increase in coal exports from the Port. Tonnage handled at the MPA public facilities fell by 445.7 thousand tons, reflecting the loss in paper tonnage, lumber, Ro/Ro cargo, and break bulk tonnage. Container tonnage fell slightly over the period, and tonnage increases were recorded for automobiles and pulp handled at the public terminals owned by the Maryland Port Administration.

Reflecting the loss of cargo at the public and private terminals, particularly the labor intensive forest products and Ro/Ro cargo, direct jobs have fallen by nearly 2,100 jobs and induced jobs fell by 5,244 jobs. The loss of induced jobs was not only driven by the loss of direct jobs, but also as the result of the increased level of savings of those directly employed, as reflected by the smaller income multiplier in 2010 compared to the level in 2006, which reflects the local consumption effect of the re-spending of personal income earned by those directly employed. Local purchases by firms also declined since 2006, falling by nearly \$300 million. This reduction in local purchases resulted in a loss of 3,325 indirect jobs.

The job losses were less for cargo moving via the public marine terminals, reflecting the growth in jobs with containerized cargo, as well as with the growth in jobs with automobiles and pulp. The major growth in jobs associated with containerized cargo moving via the Port of Baltimore is the result of the inclusion of a directly dependent shipper using the Port for containerized cargo imports, as well as the increased distance that imported containers are moved, resulting in a significant increase in truck jobs. Also, with the development of the Ports America Chesapeake concession of the Seagirt Marine Terminal, terminal employment has increased significantly since 2006.

Despite the loss of tonnage attributed to the recession, the public and private marine terminals at the Port of Baltimore continue to be a significant economic engine in the Baltimore region, supporting more than 40,000 jobs in the State's economy.

I. OVERVIEW OF THE ANALYSIS AND SUMMARY OF METHODOLOGY

Martin Associates was retained by the Maryland Port Administration to update the Economic Impact Study of the Port of Baltimore conducted in 2007 using 2006 cargo data. For the most part, this update uses the same methodology and impact definitions as the 2006 study, and, hence, the results are directly comparable to the earlier study.³ Furthermore, a computer model specific to the Port of Baltimore has been prepared which can be used in evaluating incremental impacts resulting from changes in tonnage, labor productivity, labor work rules, commodity mix, inland origins/ destinations of commodities and vessel size. In addition, the model will be useful in:

- projecting the impacts of the recruitment of a new ocean carrier or a new shipper or consignee to the Port of Baltimore;
- evaluating potential investments in port facilities; and
- preparing annual reports on the economic impacts of the Port.

The methodology used in this analysis has been developed by Martin Associates and used to estimate the economic impacts of seaport activity at more than 200 seaports in the United States and Canada.

This chapter presents an overview of the economic impact analysis by defining the following:

- The types of economic impacts estimated;
- The five economic sectors for which impacts have been estimated;
- The commodities/commodity types for which impacts have been estimated; and
- A summary of the data sources used in the analysis is presented.

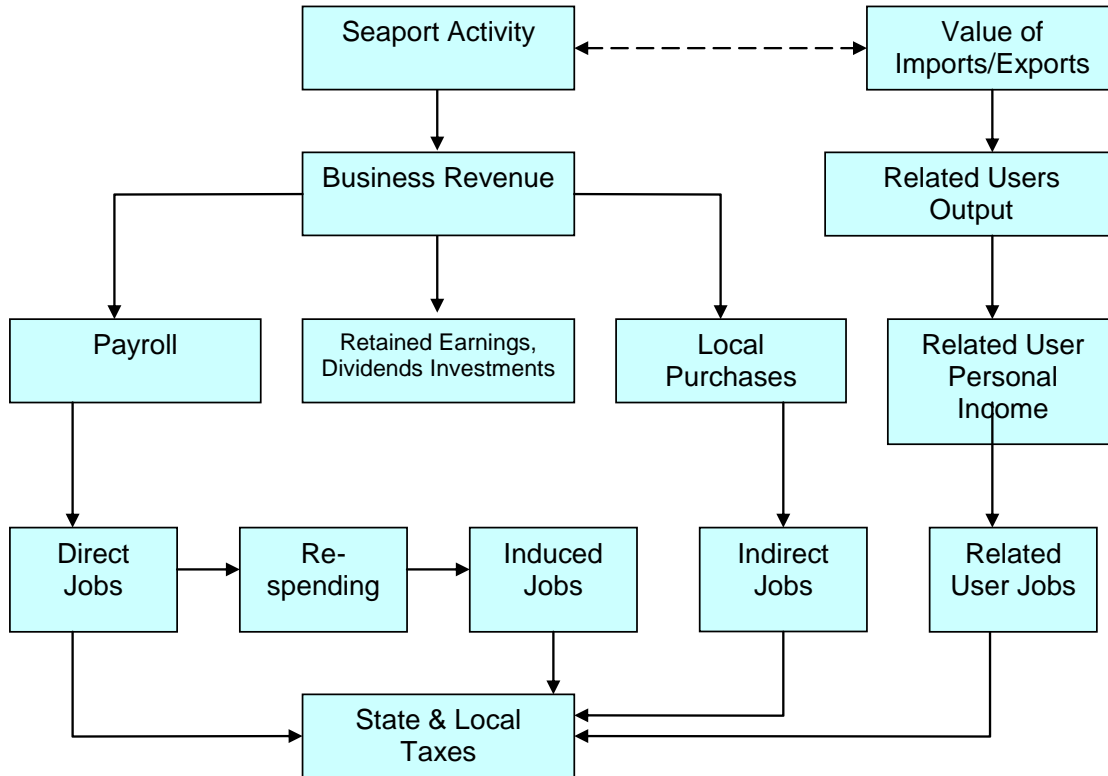
1. ECONOMIC IMPACT STRUCTURE

A deepwater port such as Baltimore contributes to the local, regional and national economies by providing employment and income to individuals, tax revenues to local and state governments and revenue to businesses engaged in handling, shipping and receiving cargo via the seaport. Exhibit I-1 shows the flow of economic impacts created by seaport activity at the public and private marine terminals at the Port of Baltimore.

Exhibit I-1

³ The Local and Regional Economic Impacts of the Port of Baltimore prepared for the Maryland Port Administration, January 28, 2008.

Flow of Economic Activity Created by the Port of Baltimore



Activity at a seaport (i.e., manufacturing, the handling of cargo and the servicing of vessels) initially creates business revenue to firms providing those cargo handling and vessel services.

This revenue is in turn used for several purposes:

- To hire employees to provide the services;
- To pay stockholders dividends, retire debt, and invest;
- To buy goods from other firms; and
- To pay federal, state, and local taxes.

The hiring of employees generates personal income. This personal income is spent throughout the state, local and national economies to purchase goods and services. This re-spending of income is known as the multiplier effect, which in turn creates induced jobs throughout the economy. Finally, federal, state and local taxes are paid by those directly employed in port activity, those employed as a result of the in-state purchases of goods and services by those individuals directly employed and by those employed to deliver goods and

business services to the direct employers.

The flow of economic impacts throughout an economy creates four separate and non-additive types of impacts. These four types of impacts are described below.

1.1 Employment Impact

The employment impact consists of direct jobs, induced jobs, indirect jobs and related jobs. The servicing of the vessels, the handling of cargo and manufacturing at the Port generates the direct employment impact. These direct jobs would not exist in the absence of cargo and vessel activity at the Port. The induced jobs are supported by the purchases of goods and services by those directly employed, and would also cease to exist if the direct jobs were discontinued. Hence, the induced jobs are dependent upon the direct jobs and the associated level of wages and salaries, and the resulting local purchases made by those directly employed (direct jobs) by activity at the Port of Baltimore.

In addition to the direct and induced jobs, another type of employment impact supported by seaport activity is the indirect job impact. These indirect jobs are generated in the local economy by the purchases of goods and services by the firms, which provide the direct jobs. For this study, indirect jobs are estimated based on the regional re-spending patterns of the firms providing the vessel and cargo handling services at the Port of Baltimore, and by the shippers/consignees directly dependent upon the port for the shipment and receipt of cargo.

The last component of the employment impact is the related job impact. Related jobs are jobs with shippers/consignees using the Port of Baltimore for the export and import of cargo. However, these shippers/consignees also use other ports and are not completely dependent upon the Port of Baltimore. The level of employment with these firms is driven by the demand for the firms' products, not because the Port of Baltimore is used. Therefore, these related jobs are not dependent upon port activity, and their degree of dependence on the Port of Baltimore is much less than the other components of the job impact.⁴

1.2 Personal Income Impact

Personal income impact is derived from three sources. First, personal income impact is the measurement of the wages and salaries generated by port activity and paid to those holding the direct jobs. As the result of local purchases by the direct employees who received the wages and salaries, a re-spending effect also occurs in the local economy. This personal income multiplier effect, which is also included in the measurement of the personal income impact, generates the induced jobs. An indirect income impact is estimated as part of this study in order

⁴The related jobs, income, value of output and taxes should not be used when evaluating the incremental economic impacts of specific port projects or the impacts of changes in cargo volume.

to capture the wage and salary income received by those indirectly employed due to the local purchases by the firms' dependent upon the Port of Baltimore. An estimate is also developed for the wages and salaries received by the related users.

1.3 Revenue Impact

The business revenue impact measures the sales generated by firms engaged in handling and transporting cargo through the Port of Baltimore. This impact includes national, as well as, local and state revenue. The value of shipments through the Port is not included as a revenue impact for the purposes of this analysis, because the value of a particular commodity shipped or received via the Port of Baltimore is determined by the demand for that particular commodity, not by the fact that the commodity moves via the Port of Baltimore. A portion of this revenue generated by providing vessel services and cargo handling services at the Port is then used to pay wages and salaries to those holding the direct jobs and to purchase goods and services to support port activity.

A measure of the total value of economic activity created in the state by cargo moving via the Port is developed to demonstrate the magnitude of the value of the economic activity supported by cargo moving via the Port.

1.4 Tax Impacts

The tax impacts measure the state and local tax revenues generated by port activity. These are taxes paid by both corporations and those holding the direct, induced, indirect and related jobs. The tax revenue impacts include the following types of taxes:

- State taxes, including personal and corporate income tax, state sales and use taxes, motor fuel tax, vehicle registration tax, property tax, property transfer tax, shellfish tax, recordation tax, death tax, horse racing tax, telecommunication tax and miscellaneous taxes;
- County taxes, including property and income taxes, as well as licensing and permit taxes;
- Municipal taxes, including the local share of the income tax and property tax;
- Federal taxes are not included, since the purpose of this report is to estimate the local and regional economic impacts of maritime activity at public and private facilities at the Port of Baltimore; and
- State and local taxes created by the related use activity are also quantified.

2. ECONOMIC IMPACT SECTOR ANALYSIS

Shipments through the Port of Baltimore generate economic impacts in various business sectors of the state and local economy. Specifically, five distinct economic sectors are involved in activity at the Port of Baltimore. These are the:

- Surface Transportation Sector;
- Maritime Service Sector;
- Shippers/Consignees using the port;
- Maryland Port Administration; and
- Banking/Insurance/Admiralty Law.

Within each sector, various participants are involved. Separate impacts are estimated for each of the participants. A discussion of each of the economic impact sectors is provided below, including a description of the major participants in each sector.

2.1 The Surface Transportation Sector

The surface transportation sector consists of both the railroad and trucking industries. These sectors are responsible for moving the various cargoes between the port and their inland origins and destinations. Two mainline railroads serve the Port of Baltimore.

Many local and national trucking firms serve the Port of Baltimore, as do numerous individual owner-operators. The trucking industry's major involvement is in moving general cargo commodities, primarily automobiles, breakbulk cargo and containerized cargo. In addition, the trucking industry plays a major role in the distribution of other dry bulk commodities, such as sugar, salt, fertilizer, ores, and liquid bulk commodities.

2.2 The Maritime Service Sector

This sector consists of numerous firms and participants performing the following maritime services:

- Cargo Marine Transportation;
- Vessel Operations and Support Services;
- Cargo Handling; and
- Federal, State, and Local Government Agencies.

A brief description of the major participants in each of these categories is provided below:

- **Cargo Marine Transportation** - Participants in this category are involved in arranging for inland and water transportation for export or import freight through the Port of Baltimore. The freight forwarder/customhouse broker is the major participant in this category. The freight forwarder/customhouse broker arranges for the freight to

be delivered between the Port and inland destinations, as well as the ocean transportation. This function performed by freight forwarders and customhouse brokers is most prevalent for general cargo commodities. For bulk cargo, arrangements are usually made by the shipper/receiver, and the cargo passes over privately owned terminals.

- **Vessel Operations and Support Services** - This category consists of several participants. The steamship agents and land-side steamship line personnel based in the port city provide a number of services for the vessel as soon as it enters the Port. For example, the agents and land-side steamship line personnel arrange for pilot services and towing, for medical and dental care of the crew, and for ship supplies. The agents and land-side steamship line personnel are also responsible for vessel documentation. Land-side steamship line personnel are also often involved in marketing the ocean carrier's services and overseeing vessel and terminal operations while the vessel is in port. In addition to the steamship agents and steamship line personnel based in the port city, other participants providing vessel services include:
 - **Chandlers** - supply the vessels with ship supplies (food, clothing, nautical equipment, etc.);
 - **Towing firms and pilots** - the towing firms provide the tug service to guide the vessel to and from port while the pilots assist in navigating the vessels along the Chesapeake Bay, the Chesapeake & Delaware Canal and the harbor channels;
 - **Barge/Tug operators** - provide the towing services to domestic and international cargo moving to and from the Port of Baltimore, primarily on the Chesapeake Bay and along the Chesapeake & Delaware Canal;
 - **Bunkering firms** - provide fuel to the vessels;
 - **Marine surveyors** - inspect the vessels and the cargo;
 - **Launch services** - provide transportation for the crew between land and vessel;
 - **Chemical testing services** - test cargo, such as coal, for proper chemical composition, water content, etc.; and
 - **Shipyards/marine construction firms** - provide repairs, either emergency or scheduled, as well as marine pier construction and dredging. Also included in this category are one-time impacts generated by the construction of new marine facilities, as well as ongoing maintenance.
- **Cargo Handling** - This category involves the physical handling of the cargo at the Port between the land and the vessel. Included in this category are the following participants:
 - **Longshoremen** - are members of the International Longshoremen's Association (ILA), and are involved in the loading and unloading of cargo from the vessels, as

well as handling the cargo prior to loading and after unloading. Private terminals, such as those handling dry bulk cargoes, typically do not use members of the International Longshoremen's Association, but instead use other union labor or non-union labor⁵;

- **Stevedoring firms** – employ and manage the longshoremen and cargo-handling activities;
 - **Terminal operators** - are often stevedoring firms who operate the maritime terminals where cargo is loaded and off-loaded. Terminal operators include those leasing facilities from the Maryland Port Administration, as well as those operating private terminals;
 - **Warehouse operators** - store cargo after discharge or prior to loading and consolidate cargo units into shipment lots;
 - **Container leasing and repair firms** - provide containers to steamship lines and shippers/consignees and repair damaged containers;
 - **Freight consolidators** - consolidate containerized cargo as well as full containers in order to achieve favorable transportation rates for their customers; and
 - **Automobile service/processing firms** - service new automobiles after they are off-loaded from the vessels and process autos for export. These processors are sometimes terminal operators, as well. The processors also prepare Ro/Ro cargo such as farm equipment and construction equipment prior to export and after import receipt.
- **Government Agencies** - This service sector involves federal, state and local government agencies that perform services related to cargo handling and vessel operations at the Port. U.S. Customs, Bureau of Immigration, U.S. Department of Labor, U.S. Department of Agriculture, and U.S. Department of Commerce employees are involved. In addition, both civilian and military personnel with the U.S. Coast Guard and the U.S. Army Corps of Engineers have been included. Finally, the marine portions of the city police and fire departments are part of this category.

2.3 Shippers/Consignees

Two categories of shippers and consignees are considered in the analysis: those that are totally dependent on the Port of Baltimore and located in proximity to the Port with private marine terminals and those located throughout the State of Maryland and other states whose business is only related to the Port of Baltimore. Those in the first category would most likely shut down operations if the Port of Baltimore were not available for their use, while those in the second category would ship or receive materials via another port. Dependent shippers/consignees include such employers as RG Steel, National Gypsum, US Gypsum, and Domino Sugar. These

⁵The International Longshoremen in this category include deep-sea longshore labor working on the vessel and on the terminal, as well as checkers and clerks, and members of the local warehousing union.

companies rely on the use of their marine terminals to receive and ship cargo for use in the manufacturing activities. Because of this difference, employment with shippers/consignees dependent upon the Port is counted in the direct employment. Employment with shippers/consignees in the second category is considered port-related, and not included in the direct job impact.

2.4 Maryland Port Administration

The Maryland Port Administration (MPA) includes those individuals employed by the State of Maryland whose purpose is to oversee port activity. The MPA leases terminal space to private operators, and maintains terminal space and infrastructure.

2.5 Banking/Insurance/Admiralty Law

While this sector is not directly involved in cargo or ship operations, it nonetheless does provide services such as financing export/import transactions, insuring cargo and vessels, and providing legal services to the Port of Baltimore, businesses and individuals working on the waterfront.

3. COMMODITIES INCLUDED IN THE ANALYSIS

A major use of an economic impact analysis is to provide a tool for port development planning. As a port grows, available land and other resources for port facilities become scarce and decisions must be made as to how to develop the land and utilize the resources in the most efficient manner. Various types of facility configurations are associated with different commodities. For example, automobiles and Ro/Ro cargo require a large area for storage, while forest products require covered storage.

An understanding of the commodity's relative economic value in terms of employment and income to the local community, the cost of providing the facilities and the relative demand for the different commodities is essential in making future port development plans. Because of this need for understanding relative commodity impacts, economic impacts are estimated for the following commodities handled via public and private facilities at the Port of Baltimore:

- | | |
|--|---|
| • Containerized cargo; | • Pulp; |
| • Automobiles; | • Lumber; |
| • Ro/Ro cargo (agricultural equipment and heavy construction machinery); | • Other breakbulk cargo (excluding pulp, paper, iron and steel products); |
| • Iron and Steel products; | • Coal/Coke; |
| • Paper; | • Iron ore; |

- Other dry bulk;
- Petroleum; and
- Other liquid bulk.

4. DATA COLLECTION

The resulting economic impacts are based on a telephone survey of members of each of the economic sectors. Participants were identified from the Port of Baltimore Marine Services Directories, as well as the database developed by Martin Associates for the 2007 Economic Impact Study of the Port of Baltimore. Telephone interviews were used to achieve a greater than 95 percent coverage in all categories. A total of 486 firms were interviewed as part of this project. The number of interviews, by category, is shown in Exhibit I-2.

Secondary data sources include the following U.S. Bureau of Census publications:

- Census of Wholesale Trade;
- Census of Retail Trade;
- Census of Construction; and
- Census of Service Industries Annual Survey of Manufacturers.

Other published data included U.S. County Business Patterns and U.S. Bureau of Labor Statistics, Consumer Expenditure Survey. Indirect impacts and related user impacts were estimated using the US Bureau of Economic Analysis, Regional Input-Output Model for the State of Maryland.

This model has been designed to update the port impact assessment on an annual basis, as well as to evaluate the incremental impacts due to changes in commodity tonnage, labor productivity, labor work rules, vessel calls (by type of vessel), pilotage and tug assist assumptions. Also, the model is designed to evaluate the impacts of new facilities development and new ocean carrier service.

Because the analysis is based on more than 95 percent coverage of the maritime community serving the Port of Baltimore, the baseline results are highly reliable and the direct impacts can be identified at the individual firm level. Since the resulting economic impact model is based on the economic relationships derived from the survey results, the incremental impacts estimated by the model have the same degree of reliability as the baseline measures.

Exhibit I-2
Summary of Interviews

THE ECONOMIC IMPACTS OF THE PORT OF BALTIMORE, 2010

Interview Summary	TOTAL
Lines/Agents	71
Government	19
Container Repair/Leasing	8
Divers/Ship Repair/Construction	22
Tug & Barge Operators	8
Warehouse & CFS	143
Marine Surveyors	30
Chandlers	44
Bunkering	3
Banking/Insurance/Law	29
Freight Forwarders	25
Maritime Services	32
Pilots	1
Railroads	4
Railroad Consolidators	5
ILA	1
Stevedores/Terminal Operators	<u>41</u>
TOTAL	486

II. EMPLOYMENT IMPACTS – MARINE CARGO

In this chapter, the employment generated as a result of calendar year 2010 port and maritime cargo activity is estimated. The economic impacts of cruise activity at the Port of Baltimore are discussed in Chapter IV. The chapter is organized as follows:

- First, the total employment that is in some way associated with the activities at the Port is estimated. This employment impact includes the direct, induced, indirect and related job impacts described in the previous chapter.
- Second, the direct job impact is analyzed in four ways:
 - Direct jobs are estimated in terms of the surface transportation sector, maritime services sector, shippers/consignees sector and the Maryland Port Administration sector.
 - Direct jobs are distributed throughout the State of Maryland by place of residence of those holding the jobs.
 - Direct jobs are estimated for each of the key commodity groups.
 - Direct jobs are estimated on a per 1,000 ton basis.
- Thirdly, the induced and indirect job impacts are described.
- Finally, related jobs with users of the Port of Baltimore are analyzed.

1. TOTAL EMPLOYMENT IMPACT

About 39,532 jobs in Maryland are supported, either directly or indirectly, by the cargo and cargo vessel activity at the Port of Baltimore in 2010. These 39,532 jobs include direct jobs, induced and indirect jobs:

- 14,407 are direct jobs, in that these jobs are generated by activities at the Port, and if such activities should cease, these jobs would be discontinued over the short term. It is these jobs that are most directly dependent upon the Port of Baltimore.⁶ Of the 14,407 direct jobs, the public facilities account for 6,446 direct jobs, while the private terminals generate 7,961 direct jobs.

⁶Of the four job impact measures (direct, induced, indirect and related), the accuracy of the estimate is greatest for the direct jobs, since these jobs are based on the survey of the 486 firms in the Baltimore Maritime Community. The induced jobs are based on an estimate of the local consumption expenditures by those directly employed, and indirect jobs are based on an estimate of the local purchases by the port-dependent firms. The related jobs are based on the value of exports and imports multiplied by the jobs to value of output ratios developed from the US Bureau of Economic Analysis.

- 14,287 are induced jobs, or those jobs supported by the local purchases made by the 14,407 individuals holding the direct jobs due to port activity. Should the direct jobs be lost from the economy, the induced jobs supporting the purchases of the direct jobs would also be lost. The MPA facilities account for 6,131 induced jobs, with private terminals accounting for the balance, 8,156 induced jobs.
- In 2010, the firms dependent upon the Port of Baltimore made \$990 million in local purchases for office supplies, equipment, utilities, communications, maintenance and repair services, transportation services, professional services and goods and services. These purchases supported 10,837 indirect jobs in the Maryland economy. Firms directly dependent upon the MPA facilities spent \$276.6 million for local purchases of goods and services, supporting 2,760 jobs. The firms directly dependent upon the private marine terminals made \$941.8 million of local purchases supporting 8,077 indirect jobs.
- In addition to the direct, induced and indirect job impacts, there are a total of 205,012 direct, induced and indirect jobs in Maryland *related* to the Port of Baltimore. Of these related jobs, 68,337 are directly related to the cargo activity at the Port of Baltimore, while the balance support induced and indirect jobs. These jobs are considered to be related to activities at the Port, but the degree of dependence on the Port is difficult to estimate. If the Port of Baltimore were not available to these organizations, they would suffer an economic penalty over the longer term. Such a penalty would vary from a loss of employment opportunities in some cases to an increase in total transportation costs in other cases, which could, in turn, result in employment reductions.

The next section of this chapter is dedicated to the impacts of 14,407 direct jobs.

2. DIRECT JOB IMPACTS

As a result of port cargo activity, 14,407 full-time jobs for Maryland residents were directly supported.⁷ In this section the jobs are analyzed in terms of:

- Distribution by economic sector;
- Distribution by place of residence;
- Distribution by commodity group; and
- Distribution per 1,000 tons.

These distributions are developed in more detail below.

⁷ Based on the number of hours worked annually in each category, the total person hour impact for that category was converted into full-time equivalent jobs. For example, two persons who are involved only 50% of the time with Port activity are counted as one full-time job.

2.1 Direct Job Impacts by Sector

Exhibit II-1 presents the distribution of the 14,407 direct jobs among the following economic sectors and the subsector job categories. Furthermore, the exhibit shows the direct job distribution for public and private terminals.

Of the 6,446 direct jobs generated by the public terminal activity, the majority, 1,608 jobs are with truckers moving cargo to and from the MPA marine terminals, followed by 1,582 members of the International Longshoremen's Association. Another 702 jobs are with terminal operators leasing facilities from the MPA.

With respect to the direct jobs created by the private marine terminals 3,290 jobs are with dependent shippers located in proximity to the Port. For the most part, these importers and exporters have their own docks and include the RG Steel operations at Sparrows Point, Domino Sugar and the wall board manufacturers who receive gypsum over private terminals. In addition to the dependent shippers/consignees using the private terminals, 1,786 trucking jobs are created by the movement of cargo over the private docks, and 867 jobs with terminal employees of the private bulk terminals and steel terminals are supported in the local economy. Another 893 jobs are with government agencies.

THE ECONOMIC IMPACTS OF THE PORT OF BALTIMORE, 2010

Exhibit II-1
Distribution of Direct Employment Impact
by Economic Sector and Job Category

	PUBLIC TERMINALS	PRIVATE TERMINALS	TOTAL
	DIRECT JOBS	DIRECT JOBS	DIRECT JOBS
SURFACE TRANSPORTATION			
Rail	59	419	478
Truck	1,608	1,786	3,394
MARITIME SERVICES			
Terminal	702	867	1,569
ILA	1,582	65	1,648
Tug Assist/Barge	37	83	120
Pilots	77	49	126
Agents	45	32	77
Maritime Services/Construction	382	380	762
Freight Forwarders	250	10	260
Warehouse	717	86	803
Government	222	893	1,115
MARYLAND PORT ADMINISTRATION	215	NA	215
DEPENDENT SHIPPERS/CONSIGNEES	550	3,290	3,840
TOTAL	6,446	7,961	14,407

Totals may not add due to rounding.

2.2 Direct Job Impacts by Residency

Exhibit II-2 demonstrates the Port's geographical impact in the State of Maryland. As this exhibit indicates, overall about 35 percent live in Baltimore City followed by 24 percent living in Baltimore County, and 17 percent residing in Anne Arundel.

Exhibit II-2
Distribution of Direct Jobs by Place of Residence

	SHARE	TOTAL DIRECT JOBS
ANNE ARUNDEL	17.14%	2,470
BALTIMORE CITY	35.34%	5,092
BALTIMORE COUNTY	24.40%	3,515
HARFORD COUNTY	6.60%	951
HOWARD COUNTY	1.84%	265
OTHER MARYLAND	9.13%	1,315
OTHER US	5.55%	799
TOTAL	100.00%	14,407

Totals may not add due to rounding.

2.3 Direct Job Impacts by Commodity

Most of the 14,407 direct jobs can be associated with the handling of specific commodities or commodity groups. Certain employment categories such as shipyards, state, federal and local government agencies, the MPA and the banking, insurance and legal sector are extremely difficult to assign to specific commodity groups, and if such an assignment is made, it is often done arbitrarily. As a result, direct jobs generated by port activity in shipyards, government agencies, the MPA and with banks, law firms and insurance companies (which totaled 2,006 jobs) are not allocated to commodity groups.

In the remainder of this section, the number of employees that were assigned to commodity groups is detailed. Exhibit II-3 indicates that containerized cargo generated the greatest number of direct jobs port-wide, followed by other breakbulk cargo. With respect to the MPA facilities, 761 direct jobs were with sectors of the economy that could not be allocated to a specific commodity. For the balance of the direct jobs, containerized cargo generated the largest number of direct jobs, 3,515 jobs, followed by 846 direct jobs with auto operations and 374 jobs with Ro/Ro operations. Break bulk cargo moving via the MPA facilities created 361 direct jobs, followed by 239 direct jobs with pulp imports.

Exhibit II-3
Distribution of Direct Job Impact by Commodity

COMMODITIES	MPA DIRECT JOBS	PRIVATE DIRECT JOBS	TOTAL DIRECT JOBS
Containers	3,515	NA	3,515
Steel Products	86	654	740
RoRo	374	69	443
Lumber	15	26	41
Paper	202	NA	202
Pulp	239	NA	239
Break Bulk	361	373	734
Automobiles	846	241	1,087
Coal	NA	1,312	1,312
Other Dry Bulk	NA	1,854	1,854
Iron Ore	NA	1,647	1,647
Petroleum	NA	486	486
Other Liquid Bulk	47	56	103
Not Allocated	<u>761</u>	<u>1,245</u>	<u>2,006</u>
Total	6,446	7,961	14,407

Totals may not add due to rounding.

General cargo commodities -- containerized cargo, autos, Ro/Ro, steel and forest products and other breakbulk cargoes -- handled at the Port of Baltimore tend to generate the greatest direct job impact with firms in the maritime service sector. The direct maritime service sector jobs generated by containerized cargo are with longshoremen, freight forwarders/customhouse brokers, warehouses, and steamship agents, as well as with trucking firms and railroads in the surface transportation sector. The jobs generated by miscellaneous breakbulk commodities and forest products are concentrated with longshoremen, while the job impacts generated by steel imports are concentrated with local trucking firms. Jobs generated by autos are concentrated with terminal operators and auto processing companies and longshoremen. Relatively small direct impacts are registered with chandlery firms due to the short length of time that general cargo vessels typically spend in port (and thus have only limited time to purchase ship stores).

In contrast, the majority of direct jobs generated by bulk commodities are concentrated with dependent shippers/consignees, followed by impacts in the surface transportation sector.

Within the maritime service sector, the direct job impact from handling bulk cargo is concentrated with private terminal operators, who also provide warehousing services for dry bulk cargoes. The impact of bulk cargo on longshoremen is relatively small, as most bulk terminals are privately owned and hire their own employees to load or unload vessels, and bulk cargo handling is not labor intensive. Longshoremen are employed by the handling of autos and Ro/Ro cargo at private terminals located in the Masonville/Fairfield area of the Port.

These generalizations concerning the distribution of the direct jobs by detailed category also apply to the distribution of the direct income and revenue impacts.

A description of the distribution of the direct job impacts associated with each commodity is provided in the remainder of this section. The major direct job impacts by category are highlighted for each commodity.

2.3.1 Containerized Cargo

In 2010, 5.7 million short tons of containerized cargo, or 387,000 containers (both full and empty) passed through facilities at the Port of Baltimore, creating 3,515 direct jobs. The majority of the jobs are with firms in the maritime service sector. Within the maritime service sector, jobs are concentrated with the longshoremen category (889 jobs), trucking (857 jobs), warehousing (675 jobs) and with freight forwarder/customhouse brokers (232 jobs).

There are 881 jobs created with the surface transportation sector and the majority of these jobs are in the trucking industry, which reflects the use of trucks in moving containerized cargo to and from the Port of Baltimore.

2.3.2 Iron and Steel Products

In 2010, 595,700 tons of non-containerized breakbulk iron and steel products moved via the Port of Baltimore, creating 740 direct jobs. The majority of these tons moved via the private terminals operating in the Port District, and are concentrated with truckers.

2.3.3 Forest Products

The 1.0 million tons of non-containerized breakbulk forest products moving via the Port of Baltimore in 2010 consisted of pulp (50%), paper (40%) and lumber (10%), and created 482 direct jobs. Two hundred seventy three of the jobs were created with truckers, followed by about 182 jobs with the longshoremen and the terminal operations.

2.3.4 Other Breakbulk Cargoes

About 543.7 thousand tons of miscellaneous breakbulk cargo commodities were handled at the Port in 2010, of which 175.5 thousand tons were handled at the public MPA terminals. The majority of the 734 direct jobs created by other breakbulk cargo are created with trucking firms and the ILA.

2.3.5 Automobiles

The Port of Baltimore has become a leading port in handling import and export automobiles. In 2010, 470,546 import and export automobiles were handled at the Port of Baltimore, generating 1,087 direct jobs. The auto processing operations leased from the MPA handled about 397,165 cars and the balance moved via private terminals. Of the 1,087 direct jobs generated by automobile and truck imports and exports, the jobs are concentrated with terminal operations/auto processing, the ILA and local trucking.

2.3.6 Ro/Ro Cargo

The Port of Baltimore handles approximately half of all the Ro/Ro cargo that crosses the docks of U.S. East Coast ports. Nearly all of the 36,045 units of Ro/Ro cargo handled in the Port in 2010 moved via the MPA facilities and the private facilities located at Fairfield/Masonville. The Ro/Ro cargo consists mainly of agricultural equipment and construction equipment and supported 443 direct jobs. These jobs are concentrated with terminal operators, ILA and trucking firms handling the Ro/Ro cargo.

2.3.7 Coal and Coke

Nearly 13.8 million short tons of coal and coke were moved via Baltimore, generating 1,312 direct jobs in the surface transportation sector and maritime service sector. The majority of the jobs are with the local steel production operations consuming the coal, followed by about 400 jobs with the railroads moving the coal from the mines to export.

2.3.8 Other Dry Bulk Cargo

The other dry bulk cargo category consists of ores (other than iron ore), gypsum, sugar, salt, chemicals and solid fertilizers. About 5.6 million short tons of these cargoes were handled at the Port, creating 1,854 full-time direct jobs. These jobs are mostly with shippers/consignees dependent on the use of the Port of Baltimore, and terminal operators associated with the dependent users. Interviews with the shippers/consignees having proprietary dry bulk terminals were used to determine the fraction of each firm's workforce that was dependent on port receipts. In several cases, firms responded that they would cease operations completely if the Port were not available for their use. For these firms, all employees are counted as part of the direct job impact.

More than 600 jobs are generated in the surface transportation sector. The fact that trucks are used to a much greater extent than rail in the distribution of other dry bulk products (primarily gypsum products, ores and sugar) is reflected in the composition of the surface transportation impact; Nearly 1,000 jobs are with dependent shippers/consignees.

2.3.9 Iron Ore

The receipt of about 2.0 million short tons of iron ore generated 1,647 direct jobs. For the most part, this iron ore is off-loaded directly at the RG Steel ore pier at Sparrows Point. The majority of these jobs are employed by the dependent shipper/consignee, RG Steel. The direct jobs with RG Steel are also distributed over the imported coal/coke cargo and the other dry bulk cargo, based on interviews.

2.3.10 Liquid Bulk Products

The liquid bulk products consist primarily of petroleum products, chemicals, molasses and liquid fertilizers. About 441.5 thousand tons of these commodities (less petroleum products) were handled at the Port and created 103 direct jobs. The majority of these direct jobs are with local trucking firms, followed by jobs with terminal operators. In

addition, 4.9 million tons of petroleum products moved via the private terminals, supporting about 486 direct jobs, the majority involved in delivering the product to local consumers.

2.4 Direct Job Impacts per 1,000 Tons

The assessment of the direct job impacts on a per 1,000 ton basis provides a tool for port planners to use in evaluating the relative importance of different commodities as economic generators. Exhibit II-4 presents the job impacts per 1,000 tons for each commodity moving via the Port of Baltimore. As this exhibit indicates, with the exception of iron ore, the general cargo commodities generate larger direct job impacts per 1,000 tons than do bulk cargoes, which reflects the more labor intensive handling process required to load and off-load general cargo commodities (forest products, other breakbulk cargo, automobiles and containers). These general cargo commodities also make a more intensive use of the maritime service infrastructure (use of agents, forwarders and warehousing services) than bulk commodities. The relatively high impact per 1,000 tons of other dry bulk and iron ore reflects the dependency upon the Port by RG Steel located at Sparrows Point as well as Domino Sugar and the two gypsum plants manufacturing wallboard.

Exhibit II-4
Job Impacts per 1,000 Tons

COMMODITIES	DIRECT JOBS/ 1,000 TONS
Containers	0.62
Steel Products	1.24
RoRo	0.61
Lumber	0.40
Paper	0.51
Pulp	0.47
Break Bulk	1.35
Automobiles	1.25
Coal	0.07
Other Dry Bulk	0.33
Iron Ore	0.83
Petroleum	0.10
Other Liquid Bulk	0.23

The importing and exporting of break bulk cargo generates the greatest direct jobs per 1,000 tons, followed by the handling of automobiles and steel products. The high job impact per 1,000 tons for automobiles reflects the labor intensive import servicing operations and export

preparations conducted at the Port, the reliance on trucks for import distribution, and the labor intensive vessel off-loading and loading process. The relatively high job impact per 1,000 tons for breakbulk cargoes reflects the highly labor intensive nature of vessel loading and discharging operations associated with breakbulk cargo.

It is to be emphasized that these jobs per 1,000 ton ratios reflect only the current situation and should not be used to estimate new impacts as the result of increases or decreases in tonnage. The direct impacts do not change in direct proportion to tonnage changes. Some jobs reflect changes in vessel calls, while other jobs are driven by tonnage. Still other jobs are fixed and do not reflect changes in throughput or vessel calls.

3. INDUCED JOBS

The in-state purchases by the 14,407 direct job holders with the direct income earned from port activity create induced jobs throughout Maryland. In 2010, \$801.8 million dollars of wages and salaries were received by those 14,407 individuals holding direct jobs created by activity at the Port of Baltimore. As the result of the re-spending of a portion of this income for purchases in the State of Maryland, 14,287 induced jobs were generated throughout the state.

These induced jobs are estimated based on the current expenditure profile of residents in the Baltimore area, as estimated by the U.S. Bureau of Labor Statistics, Consumer Expenditure Survey. This survey indicates the distribution of consumer expenditures over key consumption categories for Baltimore area residents.

The estimated consumption expenditure generated as a result of the re-spending impact is distributed across these consumption categories. Associated with each consumption category are the relevant retail and wholesale industries. Jobs to sales ratios in each industry are then computed for the Baltimore Metropolitan Statistical Area, and induced jobs are estimated for the relevant consumption categories. It is to be emphasized that induced jobs are only estimated at the retail and wholesale level, since these jobs are most likely generated in the Baltimore area and the State of Maryland. Further levels of induced jobs are not estimated, since it is not possible to accurately identify geographically where the subsequent rounds of purchasing occur.

The Consumer Expenditure Survey does not include information to estimate the job impact with supporting business/financial services, legal, social services and educational services, as well as state and municipal and county government agencies. To estimate this induced impact, a ratio of State of Maryland employment in these key service industries and government agencies to total state employment is developed. This ratio is then used with the direct and induced consumption jobs to estimate induced jobs with business/financial services, legal, social services, educational services and state and local government agencies.

4. INDIRECT JOBS

Indirect jobs are those jobs supported in the state economy as the result of local purchases by the firms directly engaged in Port activity in Baltimore. Based on the survey of port tenants and service providers, a total of \$990.0 thousand of local purchases were made by the Port dependent industries. These purchases were for goods and parts, office supplies, communications and utilities, repair and maintenance services, non-port related transportation services, etc. The local purchases were then multiplied by the respective jobs to value of output coefficients for the supplying industries within the State of Maryland, as developed for this study by the U.S. Bureau of Economic Analysis, Regional Input-Output Modeling System, for the State of Maryland. These indirect jobs multipliers indicate the second and third order spin-off impacts associated with delivery of a good or service in the State of Maryland.

Using the local purchases derived from the surveys and the indirect employment coefficients derived from the Bureau of Economic Analysis, it is estimated that 10,837 indirect jobs were also supported in the state due to the \$990.0 thousand of local purchases by Port-dependent firms.

5. RELATED JOBS

It is estimated that about 205,012 jobs with Maryland companies using the Port to ship and receive waterborne cargo are classified as related to the public and private marine terminals. Of these jobs, 68,337 are directly related to the cargo moving via the Port. These jobs are with importers of steel, forest products (paper, pulp, lumber), producers and consumers of containerized cargo and breakbulk cargo, and consumers of the gypsum, ore, coal and coke moving through the public and private marine terminals. The balance of the related jobs, 136,674, are induced and indirect jobs that support the direct production of the export cargo or the use of the intermediate products and final consumption goods.

To estimate the related user impact of the Port of Baltimore, the types of containerized cargo moving via the Port were identified from USA Trade On-Line. The average value per ton of each commodity type was then estimated using the USA Trade On-Line data. A weighted average dollar value per ton of containerized cargo moving via the Port of Baltimore was developed from this data. Next, for each of the top containerized cargo commodities (accounting for 50% of the value of export and import containerized cargo moving via the Port of Baltimore), a producing industry for export commodities and a consuming industry (for intermediate and raw material inputs) for imported commodities were identified from the US Bureau of Economic Analysis, RIMS II data base. For consumer imports, the retail sales margin was used to adjust the value of imported consumer goods via the Port of Baltimore. For imported raw materials and intermediate inputs, the consuming industry was first identified. Next, for each industry, the ratio of value of inputs to the value of output was developed from US Census of Manufacturing, 2007,

Industry Series. This ratio was used to adjust the associated employment multiplier for a containerized imported raw material or intermediate input. Using this methodology, the job multiplier associated with each containerized import or export commodity was then weighted by the value of the associated containerized import or export commodity moving via the Port of Baltimore to develop a weighted average job multiplier for imported and exported containerized cargo commodities. The value of containerized cargo imported and exported via the Port of Baltimore was then estimated using the weighted average value per ton for containerized export and import cargo. To estimate related container jobs in Maryland, these values were then multiplied by the weighted average job multipliers developed for exported and imported containerized cargo. The related jobs were then adjusted by the share of imported and exported containerized cargo estimated to be consumed or produced in the State.

A similar method was used to estimate jobs related to steel imports, forest products, coal, ore and other dry bulk cargoes. For breakbulk cargoes, the associated consuming and producing industries were identified with each commodity. For example, for imported steel, a relationship was developed to convert the dollar value of these imported materials into a dollar value of output in the key consuming industries, which include construction and metal fabrication industries. Relationships between the values of inputs to the value of outputs in these industries were estimated using data from the U.S. Bureau of Census, Census of Manufacturing and Census of Construction. These ratios were then used to convert the dollar value of the imported breakbulk cargoes into a dollar value of output in the consuming industries in the state. Using the respective jobs to value of output multipliers for these industries from the RIMS II model, the value of the breakbulk cargoes (i.e., steel products), moving via the Port and remaining in (or produced in) the State of Maryland was converted into related shipper/consignee jobs with these users and associated supporting industries within the State.

Finally, the direct, induced and indirect port sector job impacts associated with each of the cargoes for which related shipper/consignee jobs were estimated were subtracted from the total related jobs (by commodity and cargo type) to avoid double counting, as the related shipper/consignee jobs include job impacts at each stage of handling the imported and exported cargo, such as the port activity, distribution center activity, and the trucking and rail activity to move the cargo to and from the Port and the induced and indirect jobs associated with the direct port activity. Also included as related jobs are the job impacts generated at each stage of delivering an export product to the port for export, including raw material purchases, purchases of labor and capital to produce the export product, purchases of supporting services and goods to be used in the production process, the final delivery of the export cargo to the Port of Baltimore, and the induced jobs supporting the directly related jobs.

Income and value of output coefficients were developed using a similar methodology to estimate related income and total value of output in the State. These related income and value of output measures are described in the following chapter.

It is to be emphasized that these users are related to the Port in that if the Port were not available, these users could ship and receive cargo via other ports. In fact, the majority of these users currently use multiple ports for export and import, especially those moving containerized cargo through the Port. Furthermore, the level of employment with the related users is driven by the demand for the products produced by these firms, and not by the provision of cargo handling or vessel support services at the Port of Baltimore.

III. REVENUE, PERSONAL INCOME AND TAX IMPACTS – MARINE CARGO

The movement of cargo via the Port of Baltimore generates revenue throughout the state and national economies. For example, revenue is received by the surface transportation firms (both railroads and trucks) as a result of moving export cargo to the Port and distributing the imported commodities inland after receipt at the Port. The firms in the maritime service sector receive revenue from arranging for transportation services, cargo handling, providing services to vessels in port and repairs to vessels calling the Port. The Maryland Port Administration (MPA) receives revenue from terminal and equipment leases at Dundalk Marine Terminal, Clinton Street Pier 1, the concession of Seagirt to Ports America Chesapeake, Masonville, Hawkins Point, North and South Locust Point Terminals, and from the World Trade Center. In addition, revenue is received by shippers/consignees from the sales of cargo shipped or received via Baltimore and from the sales of products made with raw materials received through the Port.⁸

The revenue generated by port activity consists of many components. For example, gross revenue is used to pay employee salaries and taxes, it is distributed to stockholders, and it is used for the purchases of equipment and maintenance services. Of these components, only three can be isolated geographically with any degree of accuracy. These are the personal income component of revenue, which can be traced to geographic locations based on the residence of those receiving the income, the state and local tax impacts, and the local purchases made by the firms directly dependent on the Port of Baltimore.

The direct personal income impact within the state accounts for about 48 percent of the total revenue generated by the Port activity in 2010. The balance of the revenue is distributed in the form of payments to firms providing goods and services to the five sectors, for the distribution of company profits to shareholders and to payment of state, local, and federal taxes. Many of these firms and owners are located outside of Maryland, and, thus, it is difficult to trace the ultimate location of the distributed revenue (other than personal income and taxes).

Since it is difficult to trace the revenue beneficiaries, an estimate of revenue is developed, but no conclusions are formulated as to how the revenue (other than personal income, taxes and local purchases by firms) is distributed, geographically. The distribution of personal income and

⁸ The revenue from the sales of goods produced with the imported cargo using the public and private terminals as well as the revenue from the sales of exports using the Port of Baltimore is not included in the direct revenue impact. An estimate was made of the revenue earned by the direct shippers/consignees and this was estimated at \$2.2 billion. This revenue is not included in direct revenue since if these companies were to relocate to another Port, the revenue from the sales of these products would be generated as long as there exists a demand. The direct jobs and income would, however, be lost from the Baltimore area should these dependent shippers/consignees relocate away from the Port of Baltimore to another Port city.

the income from indirect jobs supported by the local purchases can be traced accurately through the geographic location of individuals receiving the income.

The value of output created by users of the Port is measured for the State of Maryland and the local purchases from other firms within the region are also included in this user output measure, as defined by the in-state output coefficients (for the user industries) developed from the U.S. Bureau of Economic Analysis, Regional Input-Output Modeling System (RIMS II).

1. TOTAL ECONOMIC ACTIVITY

The revenue impact is a measure of the *total economic activity* in the state that is generated by the cargo moving via the Port of Baltimore. In 2010, marine cargo activity at the Port generated a total of \$45.6 billion of total economic activity in the State. This economic value provides the economic value of the marine cargo activity at a given point in time, 2010, and consists of the direct business revenue impact generated by marine cargo activity at the public and private terminals, \$1.6 billion, plus the related economic value of \$42.1 billion, and the induced/respending impact generated by the marine cargo activity at the public and private terminals, \$1.8 billion. These components exclude double counting and represent the total economic value of the cargo activity at the Port of Baltimore public and private marine terminals. Of the \$45.6 billion, \$1.6 billion is the direct business revenue received by the firms directly dependent upon the Port and providing maritime services and inland transportation services to the cargo handled at the marine terminals and the vessels calling the port. The remaining \$42.1 billion represents the value of the output to the State of Maryland that is created due to the cargo moving via the Port of Baltimore. This includes the value added at each stage of producing an export cargo, as well as the value added at each stage of production for the firms using imported raw materials and intermediate products, as well as consumer products that flow via the marine terminals at the Port of Baltimore and are consumed by industries and individuals within the region.

The balance of the discussion focuses on the \$1.6 billion of direct business revenue generated from the provision of services to the cargo and vessels handled at the Port of Baltimore public and private marine terminals.

2. DIRECT BUSINESS REVENUE IMPACT

Exhibit III-1 presents the total revenue (\$1.6 billion) estimated to have been generated by port activity in 2010 both at public and private terminals.

THE ECONOMIC IMPACTS OF THE PORT OF BALTIMORE, 2010

Exhibit III-1
Total Revenue Generated by Port Activity
(Thousands)

	PUBLIC TERMINALS	PRIVATE TERMINALS	TOTAL REVENUE
	\$1,000	\$1,000	\$1,000
SURFACE TRANSPORTATION			
Rail	\$48,726	\$274,936	\$323,662
Truck	\$148,106	\$162,552	\$310,657
Pipeline	NA	\$60,671	\$60,671
MARITIME SERVICES			
Terminal	\$175,562	\$207,521	\$383,083
Tug Assist	\$11,265	\$15,754	\$27,020
Pilots	\$31,596	\$22,872	\$54,468
Agents	\$4,731	\$2,790	\$7,520
Maritime Services/Construction	\$97,118	\$184,508	\$281,626
Freight Forwarders	\$41,718	\$1,652	\$43,370
Warehouse	\$72,060	\$8,504	\$80,564
Government	NA	NA	NA
MPA	\$69,000	NA	\$69,000
DEPENDENT SHIPPERS/CONSIGNEES	NA	NA	NA
TOTAL	\$699,881	\$941,759	\$1,641,640

Totals may not add due to rounding.

Dockworkers/ILA revenue included with terminal operators. No revenue was estimated for the dependent shippers/consignees.

The MPA facilities generate \$699.9 million of the revenue impact compared to \$941.8 million generated by cargo and vessel activity at the private terminals. The largest revenue impact created by the MPA terminals was with stevedores and terminal operators, followed by revenue received by the trucking industry serving the MPA terminals, and revenue received from maritime services/marine construction. For the activity at private terminals, railroads received the largest revenue impact, primarily from the transport of coal and other bulk cargoes, followed by revenue received by terminal operations, then maritime services/construction and trucking.

It is to be emphasized that commodity value and gross revenue from the sales of products moving via the Port of Baltimore are not included as part of the revenue impact, since the value of the cargo and level of product sales is determined by the demand for the product, not by the use of the Port of Baltimore. This value is included in the economic value of output of the Port to the State -- \$42.1 billion.

Exhibit III-2 shows the total revenue impact by commodity and Exhibit III-3 presents the revenue per ton.

These exhibits show that:

THE ECONOMIC IMPACTS OF THE PORT OF BALTIMORE, 2010

- In terms of total revenue, containerized cargo generates the greatest revenue impact at the Port, followed by coal/coke.
- In terms of revenue per ton, automobiles, breakbulk cargo, containers, steel and pulp generate the greater revenue impacts per ton, reflecting the higher value added associated with the handling of general cargo commodities.

Exhibit III-2
Revenue Impacts by Commodity
(Thousands of Dollars)

COMMODITIES	PUBLIC TERMINALS \$1,000	PRIVATE TERMINALS \$1,000	TOTAL \$1,000
Containers	\$337,849		\$337,849
Steel Products	\$1,545	\$26,625	\$28,170
RoRo	\$19,466	\$3,063	\$22,529
Lumber	\$784	\$2,321	\$3,105
Paper	\$17,632		\$17,632
Pulp	\$23,694		\$23,694
Break Bulk	\$12,041	\$25,260	\$37,301
Automobiles	\$129,123	\$23,857	\$152,980
Coal		\$336,548	\$336,548
Other Dry Bulk		\$116,005	\$116,005
Iron Ore		\$14,385	\$14,385
Petroleum		\$209,097	\$209,097
Other Liquid Bulk	\$7,320	\$7,382	\$14,702
Not Allocated	<u>\$150,428</u>	<u>\$177,216</u>	<u>\$327,643</u>
Total	\$699,881	\$941,759	\$1,641,640

Totals may not add due to rounding.

Exhibit III-3
Revenue per Ton

COMMODITIES	REVENUE/TON
Containers	\$59.8
Steel Products	\$47.3
RoRo	\$31.3
Lumber	\$29.9
Paper	\$44.4
Pulp	\$46.4
Break Bulk	\$68.6
Automobiles	\$175.6
Coal	\$18.1
Other Dry Bulk	\$20.6
Iron Ore	\$7.2
Petroleum	\$43.0
Other Liquid Bulk	\$33.3

In the next section of this chapter, the personal income impacts of the Port are described.

3. PERSONAL INCOME IMPACTS

In the previous section of this chapter, the total revenue generated by port activity was identified. As described earlier, the personal income received by those directly dependent upon port activity is one of three components of revenue that can be traced to the State of Maryland with a high degree of accuracy.

The income impact is estimated by multiplying the average annual earnings of each port participant, i.e., railroad employees, truckers, steamship agents, freight forwarders, bankers, insurance agents, etc., by the corresponding number of jobs in each category. The individual annual earnings in each category multiplied by the corresponding number of employees resulted in \$801.8 million in personal income, for an average annual salary of about \$55,651 per year for each job directly generated by maritime cargo activity at the Port of Baltimore.

Based on data developed by the U.S. Bureau of Economic Analysis, Regional Input Output Multiplier System (RIMS II), for every one dollar earned by Maryland residents holding the direct jobs as a result of port activity, an additional \$2.219 of income and consumption expenditures would be created as a result of re-spending the income for purchases of Maryland produced goods and services. Hence, an income multiplier of 3.219 was used to estimate the re-

spending/consumption impact of \$1.8 billion. This additional re-spending of the direct income supports the 14,287 induced job impact, described in the previous chapter.⁹

In addition to the re-spending impact, income was also received by those individuals indirectly employed due to activity at the Port of Baltimore. The 10,837 indirectly employed workers received wage and salary income of \$426.0 million. Therefore, the total personal income and consumption impact of the Port of Baltimore is estimated at over \$3.0 billion in the year 2010.

Finally, it is estimated that the 205,012 direct, induced and indirect related users earned \$11.3 billion of total personal income.

4. TAX IMPACTS

The state and local taxes for which estimates have been developed include:

- State taxes, including personal and corporate income tax, state sales and use taxes, motor fuel tax, vehicle registration tax, death tax, property tax and property transfer tax, recordation tax, shellfish tax, horse racing tax, telecommunication tax, boating tax, and other miscellaneous taxes.
- County taxes including property and income tax, and licensing and permit taxes.
- Municipal taxes including the local share of the state and county income and property taxes allocated to the local level.

In total, port activity created \$300.7 million of state and local taxes. These state and local tax impacts are based on a per capita income basis, from data estimated for the State of Maryland by the Tax Foundation. The tax impacts include taxes collected at the state, county and local levels throughout the State. Exhibit III-4 presents the breakdown of the \$300.7 million of state and local taxes based on the direct, induced and re-spending and indirect income impacts. Of the \$300.7 million of state and local taxes, \$170.4 million are received by the State of Maryland, while \$130.3 million are received by the county and local governments in the state.

⁹The re-spending effect includes personal income as well as consumption expenditures, which are distributed as business revenue to companies. Furthermore, the induced jobs are only estimated at the retail and wholesale level, and additional rounds of induced jobs are not estimated in order to ensure a very conservative estimate of the resulting impacts. Therefore, the re-spending effect cannot be divided by the induced job impact to yield an average induced income, as this would highly overstate personal earnings received by the induced employees.

Exhibit III-4
Composition of Direct, Induced and Indirect State and Local Taxes
(\$1,000)

Tax	State	County/Local	Total
Property	\$7.8	\$69.0	\$76.8
Sales and Gross Receipts	\$69.0	\$5.6	\$69.0
Personal Income	\$72.4	\$47.9	\$120.3
Corporate Income	\$8.4	NA	\$8.4
License	\$4.9	NA	\$4.9
Other	<u>\$7.9</u>	<u>\$7.8</u>	<u>\$15.7</u>
Total	\$170.4	\$130.3	\$300.7

Totals may not add due to rounding.

The cargo activity at the Port of Baltimore generated \$1.1 billion of state and local taxes with the related users.

IV. ECONOMIC IMPACT OF CRUISE SERVICE AT THE PORT OF BALTIMORE

In 2010, the Port of Baltimore hosted 94 calls by cruise lines carrying more than 400,000 passengers. There were four port calls and 90 home ported cruises from the Port. About 419,000 passengers embarked and debarked at the Port of Baltimore. The cruise vessel activity, the passengers embarking on the cruises and the crew on board the vessels create economic activity within the Baltimore metropolitan region. Specifically, two sectors of the local economy are impacted by the cruise activity at the Port.¹⁰ These sectors are the:

- Maritime Service Sector; and
- Visitor Industry Sector.

The maritime service sector includes those firms that provide services to the cruise vessels while in port, such as:

- Chandlers and other local retailers and wholesalers that provide ship stores and provisions to be used by passengers and crew;
- Towing services that assist vessels in docking and undocking (a majority of the new cruise vessels are equipped with bow and stern thrusters and the need for tug assistance is minimized);
- Pilots that assist the vessels navigating the channels from the open sea and along the Chesapeake to the Port's Cruise terminal;
- Stevedoring services performed by members of the International Longshoreman's Association, including handling baggage and ship supplies;
- Linehandling services that are required when a vessel enters port;
- Bunkering firms that provide fuel to the vessels;
- Parking services for the passengers driving from their place of residence to embark on the cruise; and
- Ground transfers from the airport and hotels to the ship prior to and after the cruise.

The visitor industry sector consists of firms providing services to the passengers and crew of the current cruises prior to and after the cruise. Included in this category are:

- Hotels and motels;

¹⁰ Martin Associates conducted an economic impact study of the 2009 Cruise Season at the Port of Baltimore and developed an economic impact model to assess the economic impacts of changing levels of cruise passengers and vessel calls. This study was released on March 26, 2010, and is available on the Port's website. The model developed as part of the 2009 Cruise Impact Study was used to estimate the economic impacts generated by the cruise activity in 2010, presented in this chapter.

- Restaurants/bars;
- Retail goods; and
- Entertainment establishments such as, movies and sports events.

To estimate these impacts, the officials of the cruise lines calling the Port of Baltimore were interviewed, including Carnival Cruise Lines, Royal Caribbean Lines, Celebrity Cruises and Norwegian Cruise Lines. The purpose of these interviews was to determine the amount of purchases, by type of service, made by each vessel call and type of service. Types of purchases include vessel purchases for:

- | | |
|-----------------------|--------------------------|
| • Ship stores | • Linehandling |
| • Bunkers | • Tendering services |
| • Water | • Stevedoring |
| • Liquor | • Retail items |
| • Flowers | • Maintenance and repair |
| • Pilots | • Trash disposal |
| • Tugs | • Laundry |
| • Local advertising | • Crew allowance |
| • Local travel agents | • Wharfage and dockage |

Cruise ship expenditure data was provided by the cruise lines and were used to develop a typical ship disbursement account profile for each type and size class of ship. Most supplies purchased by the cruise lines calling the Port of Baltimore are supplied from sources located in Florida, and to a lesser extent from New York. For the cruise vessels making a call in Florida after departing from Baltimore, the vessels are typically chandleryed at a Florida Port, where most cruise lines maintain contracts with local suppliers of retail sundries as well as food. This supply chain has been established in Southern Florida to serve the large cruise markets at such ports as Port Canaveral Port Everglades and Miami. Serving the Baltimore cruise vessels with this supply chain provides a more cost effective alternative than supplying services and goods at Baltimore. For the cruise vessels not calling a Florida port after the Baltimore departure, supplies are typically trucked from New York, where a similar logistics supply chain to serve the cruise service at the Port of New York has been established. Should a critical threshold of cruise service be established at the Port of Baltimore, a logistics supply chain could potentially be established at Baltimore. For example, the Florida Ports of Miami, Port Everglades and Port Canaveral each handle between 3 and 4 million passengers per year, compared to the 400,000 passengers handled at the Port of Baltimore. As of the most recent passenger count, the Port of New York handled nearly 1.1 million passengers.

Associated with each vessel expenditure category are jobs to sales ratios with the types of firms providing the goods and services to a homeported vessel. These jobs to sales ratios as well as personal income levels were developed from the U.S. Bureau of Census data sources for the Baltimore Metropolitan Area. The total annual expenditures, by type of service, is multiplied by

the corresponding jobs to sales ratios to estimate the total direct job impacts in the maritime service sector, by type of service.

The revenue impacts are estimated directly from the expenditure profiles provided by the carriers. Direct income is estimated from the average annual salaries developed by type of firm, from the interviews. Each vessel homeported at the Port of Baltimore spends about \$500,000 to \$550,000 per call on such services as bunkering, pilotage, wharfage and dockage, water removal, security and stevedoring. The majority of the purchases are for bunkers. If all supplies were taken onboard at Baltimore, the average purchases by the vessel for each call would approach \$850,000.

The jobs generated in the Visitor Industry/Tourism Sector (for example, hotels, restaurants, etc.) were estimated based on two surveys of 600 passengers each. One set of surveys was conducted July 30, 31 & August 2, 2009, while a second set was conducted January 10 – 11, 2010. A summer and a winter set of surveys were conducted by Martin Associates in order to control for differences in the demographic and spending compositions of the passengers. Of particular interest from the surveys is the total number of passengers per vessel call, the percent that stay in local hotels prior to or after the homeport cruise, as well as the purchases made by the passengers in the local economy. These purchases include expenditures on hotels for embarking and debarking passengers, as well as local purchases for retail items, food and local landside tours. The average expenditures on hotel lodging and nights stayed pre- and post cruise, as well as food and in-town cabs are entered into the visitor industry model. The key findings from the passenger surveys are:

- 37% of the cruise passengers are residents of Maryland;
- Most passengers arrive by private automobile:
 - 73% of the passengers arrive by personal car;
 - 16% by shuttle/limo/cab;
 - 9% by motor coach;
 - Less than 1% by air;
- 25% of the cruise passengers spend a night in Baltimore prior to the cruise and of those spending the night 85% stay in a hotel/motel, while the balance stay in private homes;
- 3% spend a night in Baltimore after the cruise. Of those spending a night in Baltimore after the cruise, about 60% stay in a hotel/motel while the balance stay in private homes, typically with families; and
- Every passenger embarking on a cruise in Baltimore spends nearly \$15 in the City excluding parking. For those spending a night in Baltimore before the cruise, each passenger spends about \$78 in the City. For those spending a night after the cruise, each passenger spends about \$82.

In addition to the passenger surveys, Martin Associates conducted surveys of 400 crew members on board the cruise lines calling the Port. The crew surveys were administered on

board the vessels as well as at the Port of Baltimore during the passenger surveys. Based on the crew surveys, 67% of the crew on each vessel debarks from the vessel while in Port at Baltimore. The majority of the crew that debarks at Baltimore visit local retailers, such as Wal*Mart and spend about \$200 per call at Baltimore. Electronics, clothing, and food and beverages are the major items purchased. The crew spends an average of about 3 to 4 hours in Baltimore.

In order to assess the economic impacts of potential cruise business at the Port of Baltimore, Martin Associates developed a spreadsheet framework, which can be used to assess the impacts of changes in such factors as:

- Number of cruise vessel calls;
- Number of passengers;
- Passenger characteristics:
 - Local expenditures;
 - Local residents versus tourists;
 - Length of time and where stayed after disembarking;
- Different types of cruise service, including:
 - Homeport;
 - Port of Call;
- Size of crew; and
- Size of vessel.

This model was then used to estimate the impacts of current and potential cruise operations at the Port of Baltimore. Four types of economic impacts are generated by cruise activity at the Port of Baltimore.

1. EMPLOYMENT IMPACT METHODOLOGY

The employment impact consists of direct jobs, induced jobs, and indirect jobs. The servicing of the vessels, the cruise passengers and the crew generates the direct employment impact. These direct jobs would not exist in the absence of cruise activity at the Port. The induced jobs are supported by the purchases of goods and services by those directly employed, and would also cease to exist if the direct jobs were discontinued. Hence, the induced jobs are dependent upon the direct jobs and the associated level of wages and salaries, and the resulting local purchases made by those directly employed (direct jobs) by cruise activity at the Port of Baltimore.

In addition to the direct and induced jobs, another type of employment impact supported by seaport activity is the indirect job impact. These indirect jobs are generated in the local economy by the purchases of goods and services by the firms, which provide the direct jobs. For this study, indirect jobs are estimated based on the regional re-spending patterns of the firms handling services at the Port of Baltimore.

2. PERSONAL INCOME IMPACT METHODOLOGY

Personal income impact is derived from three sources. First, personal income impact is the measurement of the wages and salaries generated by port activity and paid to those holding the direct jobs. As the result of local purchases by the direct employees who received the wages and salaries, a re-spending effect also occurs in the local economy. This personal income multiplier effect, which is also included in the measurement of the personal income impact, generates the induced jobs. An indirect income impact is estimated as part of this study in order to capture the wage and salary income received by those indirectly employed due to the local purchases by the firms' dependent upon the cruise activity at the Port of Baltimore. An estimate is also developed for the wages and salaries received by the related users.

3. REVENUE IMPACT METHODOLOGY

The business revenue impact measures the sales generated by firms engaged in servicing the cruise vessels while in port and providing services to the passengers and the crew on the cruise vessels. A portion of this revenue generated by providing vessel services and services to cruise passengers and crew is used to pay wages and salaries to those holding the direct jobs, and to purchase goods and services to support port activity. Another portion of the revenue is used to make local purchases, supporting the indirect jobs.

4. TAX IMPACT METHODOLOGY

The tax impacts measure the state and local tax revenues generated by port activity. These are taxes paid by both corporations and those holding the direct, induced, and indirect jobs.

5. SUMMARY OF 2010 ECONOMIC IMPACTS OF CRUISE OPERATIONS

Using the economic impact model developed by Martin Associates, the potential economic impacts of the 2010 cruise are presented in Exhibit V-1.

THE ECONOMIC IMPACTS OF THE PORT OF BALTIMORE, 2010

Exhibit IV-1
Economic Impact of Projected Cruise Service at the Port of Baltimore
(2010)

	MPA CRUISE
JOB	
Direct	219
Induced	186
Indirect	<u>100</u>
TOTAL	505
PERSONAL INCOME (\$ Millions)	
Direct	\$8.2
Re-spending/Local Consumption	\$18.7
Indirect	<u>\$3.3</u>
TOTAL	\$30.2
BUSINESS REVENUE	\$68.6
LOCAL PURCHASES (\$ Millions)	\$3.9
STATE AND LOCAL TAXES (\$ Millions)	\$3.3

The projected level of cruise service activity for the 2010 cruise season at the Port of Baltimore is estimated to generate the following economic impacts.

505 direct, induced and indirect jobs are projected to be supported in the State of Maryland due to the cruise activity at the Port of Baltimore. Of the 505 jobs:

- 219 were direct jobs;
- 186 were induced jobs; and
- 100 were indirect jobs.

More than \$30 million of local wages and salaries are projected to be generated by the cruise activity at the Port of Baltimore in 2010:

- \$8.2 million of direct wages and salaries were generated and received by the 219 directly generated jobs, for an average salary of \$37,941 per direct employee;
- As the result of re-spending, another \$18.7 million of re-spending and consumption purchases were generated and supported the 186 induced jobs; and

- The 100 indirect job holders received \$3.3 million of wages and salaries.

The 2010 cruise activity at the Port of Baltimore is projected to generate \$72.5 million of business revenue to local businesses supplying services to the cruise vessels, passengers and crew.

- Of the \$72.5 million of direct business revenue are projected to be generated by the cruise activity in 2010, the vessel expenditures are projected to generate:
 - \$68.6 million of revenue to local businesses; and
 - \$3.9 million of local purchases made by those firms dependent upon the cruise business at the Port of Baltimore during the 2010 cruise season.

\$3.3 million of state and local taxes are projected to be generated by the cruise activity at the Port of Baltimore in 2010.

V. COMPARISONS WITH 2006 IMPACTS

The purpose of this chapter is to provide a comparison of the 2010 economic impacts generated by the public and private marine terminals at the Port of Baltimore with the impacts generated by maritime activity at the Port in 2006. The methodology used by Martin Associates to measure the direct local and regional economic impacts generated by the Port in 2010 is, for the most part, identical to the methodology used to measure the direct impacts generated by maritime activity at Baltimore in 2006.

1. COMPARISON OF TONNAGE ACTIVITY

The last economic impact study conducted for the Port of Baltimore was conducted by Martin Associates in 2007, using 2006 cargo data. Since the last study, the economic recession has had a significant impact on cargo activity at the public and private marine terminals. Between 2006 and 2010, total tonnage at the public and private terminals fell by 59.4 thousand tons overall. The largest tonnage losses occurred with a 2.4 million ton loss of iron ore tonnage, a 1.1 million ton loss of break bulk cargo, a 1.6 million ton loss of petroleum products and an 843 thousand ton loss of other liquid bulk cargo. In addition, paper tonnage handled at the Port was down nearly 290 thousand tons. These significant losses of cargo were offset to a large extent by the nearly 5.1 million ton increase in coal exports from the Port

Exhibit V-1
Tonnage Comparison - All Terminals at the Port of Baltimore
(1,000 short tons)

	2010 1,000 Tons	2006 1,000 Tons	Change 1,000 Tons
Containers	5,648.0	5,735.0	-87.1
Steel Products	595.7	330.3	265.3
RoRo	720.9	807.9	-87.0
Lumber	103.7	140.6	-36.9
Paper	396.8	683.0	-286.1
Pulp	510.3	349.3	161.0
Break Bulk	543.7	1,674.0	-1,130.3
Automobiles	871.0	675.1	195.8
Coal	18,592.5	13,528.2	5,064.3
Other Dry Bulk	5,630.0	4,963.8	666.2
Iron Ore	1,990.5	4,355.1	-2,364.6
Petroleum	4,861.5	6,438.4	-1,576.9
Other Liquid Bulk	<u>441.5</u>	<u>1,284.8</u>	<u>-843.3</u>
Total	40,906.0	40,965.4	-59.4

Totals may not add due to rounding.

Tonnage handled at the MPA public facilities fell by 445.7 thousand tons, reflecting the loss in paper tonnage, lumber, Ro/Ro cargo and break bulk tonnage. Container tonnage fell

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slightly over the period, and tonnage increases were recorded for automobiles and pulp handled at the public terminals owned by the Maryland Port Administration.

Exhibit V-2
Tonnage Comparison – Public Facilities Owned by the Maryland Port Administration
(1,000 short tons)

	2010 1,000 Tons	2006 1,000 Tons	Change 1,000 Tons
Containers	5,648.0	5,690.0	-42.1
Steel Products	35.4	131.3	-95.9
RoRo	622.9	807.9	-185.0
Lumber	26.2	67.6	-41.4
Paper	396.8	683.0	-286.1
Pulp	510.3	349.3	161.0
Break Bulk	175.5	311.4	-135.9
Automobiles	735.1	514.7	220.5
Other Liquid Bulk	219.8	<u>260.7</u>	<u>-40.9</u>
Total	8,370.0	8,815.7	-445.7

Totals may not add due to rounding

2. COMPARISON OF TOTAL IMPACTS

Exhibit V-3 shows the total port-wide impacts generated by maritime activity at the public and private facilities at the Port of Baltimore in 2006 and 2010.

Reflecting the loss of cargo at the public and private terminals, particularly the labor intensive forest products and Ro/Ro cargo, direct jobs have fallen by nearly 2,100 jobs and induced jobs fell by 5,244 jobs. The loss of induced jobs was not only driven by the loss of direct jobs, but also as the result of the increased level of savings of those directly employed, as reflected by the smaller income multiplier in 2010 compared to the level in 2006, which reflects the local consumption effect of the re-spending of personal income earned by those directly employed. In 2006, the U.S. Bureau of Economic Analysis estimated that for every \$1.00 of direct salary earned in water transportation in the State of Maryland, another \$2.95 of local consumption expenditures would be generated. By 2010, the Bureau of Economic Analysis estimated that the local purchases fell from \$2.95 to \$2.22. Therefore, the re-spending multiplier for water transportation in the State of Maryland fell from 3.95 in 2006 to 3.22 in 2010, reflecting the reduction in consumption activity for every dollar of direct personal income earned. This reduction of the income multiplier resulted in a lower local consumption impact per dollar of direct income and subsequently in a reduction in the induced job impact. In addition to the decline in the income multiplier, there were significant gains in productivity over the 2006-2010 period, reflecting a lower job impact given a dollar of output or purchases. For example, jobs to the value of sales for induced jobs (obtained from the US Bureau of Census, Economic

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Census 2002 and 2007) are about 18% lower in the current study than in the 2006 study. Therefore, for a \$1.00 expenditure by consumers, the resulting jobs generated will be 18% lower in 2010 than in the 2006 study.

Local purchases by firms also declined since 2006, falling by nearly \$300 million. This reduction in local purchases resulted in a loss of 3,325 indirect jobs. This same productivity impact exists for the indirect jobs, generated by local purchases by the dependent firms.

Direct income increased slightly in 2010, reflecting an increase in average salary paid to direct workers. In 2006, the average direct salary was \$47,778 compared to \$55,654. This reflects a growth in dependent shippers/consignees over the period, as these dependent shippers/consignees have an average salary in excess of \$60,000 on average.

Exhibit V-3
Comparison of Impacts - Portwide

	2010 Impacts	2006 Impacts	Change Impacts
JOBS			
DIRECT	14,407	16,493	-2,085
INDUCED	14,288	19,532	-5,244
INDIRECT	<u>10,836</u>	<u>14,161</u>	<u>-3,325</u>
TOTAL	39,532	50,186	-10,654
PERSONAL INCOME (MILLIONS \$)			
DIRECT	\$801.8	\$788.0	\$13.8
RE-SPENDING/LOCAL CONSUMPTION	\$1,778.8	\$2,324.6	-\$545.9
INDIRECT	<u>\$426.0</u>	<u>\$516.9</u>	<u>-\$90.9</u>
TOTAL	\$3,006.6	\$3,629.5	-\$622.9
BUSINESS REVENUE (MILLIONS \$)	\$1,641.6	\$1,850.7	-\$209.1
LOCAL PURCHASES (MILLIONS \$)	\$990.0	\$1,286.9	-\$296.9
STATE & LOCAL TAXES (MILLIONS \$)	\$300.7	\$388.4	-\$87.7

Totals may not add due to rounding.

The job losses were less for cargo moving via the public marine terminals, reflecting the growth in jobs with containerized cargo, as well as with the growth in jobs with automobiles and pulp. The major growth in jobs associated with containerized cargo moving via the Port of Baltimore is the result of the inclusion of a directly dependent shipper using the Port for containerized cargo imports, as well as the increased distance that imported containers are moved, resulting in a significant increase in truck jobs. Also, with the development of the Ports America Chesapeake concession of the Seagirt Marine Terminal, terminal employment has

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increased significantly since 2006. The comparison of impacts generated by cargo moving via the MPA's facilities are shown in Exhibit V-4.

Exhibit V-4
Comparison of Impacts – MPA Facilities

	2010 MPA Impacts	2006 MPA Impacts	Change
JOB			
DIRECT	6,446	6,775	-329
INDUCED	6,131	7,497	-1,366
INDIRECT	<u>2,760</u>	<u>2,146</u>	<u>614</u>
TOTAL	15,337	16,418	-1,081
PERSONAL INCOME (MILLIONS \$)			
DIRECT	\$349.6	\$296.4	\$53.2
RE-SPENDING/LOCAL CONSUMPTION	\$775.6	\$874.5	-\$98.9
INDIRECT	<u>\$117.7</u>	<u>\$87.1</u>	<u>\$30.6</u>
TOTAL	\$1,242.9	\$1,258.1	-\$15.1
BUSINESS REVENUE (MILLIONS \$)	\$699.9	\$986.9	-\$287.0
LOCAL PURCHASES (MILLIONS \$)	\$276.6	\$220.4	\$56.2
STATE & LOCAL TAXES (MILLIONS \$)	\$124.3	\$134.6	-\$10.3

As shown in Exhibit V-4, local purchases by the firms directly dependent on the cargo moving via the MPA facilities actually increased since 2006, resulting in an increase in indirect jobs over the period. However, the lower income multiplier results in smaller re-spending/local consumption impact, reducing the tax impact as well as the induced job impact.

3. COMPARISON OF DIRECT JOB IMPACTS

Exhibit V-5 shows the direct job impacts generated by job category. As this category shows, job losses were recorded in nearly all categories, with the largest job loss recorded in the maritime services/marine construction/shipbuilding category, which reflects the decline in shipbuilding and repair activity and marine construction activity at the Port of Baltimore since 2006. The decline in government jobs dependent on the port activity is actually misleading, since the actual number of government jobs with the agencies providing services to the Port actually increased since 2006, but the share of the jobs that are 100% dependent on the seaport activity in these agencies declined since 2006. The decline in jobs with the ILA reflects the fact that in 2006, other unionized and non-union dockworker jobs were included in this category, while these non-ILA jobs are now included with terminal operators and dependent shippers/consignees

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with private terminals. This is reflected in the growth in dependent shippers/consignees, which also includes some workers that were included in terminal jobs in 2006. The growth in pilot jobs reflects the inclusion of pilot administrative workers as well as the merger of the Docking Pilots with the Harbor Pilots since the last study.

Rail jobs have fallen due to the reduction in iron ore imports, as well as the increased size of unit trains delivering coal for export. The decline in break bulk operations as well as paper imports has resulted in a loss of terminal jobs as well as trucking jobs and maritime services jobs.

Exhibit V-5
Comparison of Direct Jobs by Job Category - Portwide

	2010	2006	Change
	Direct Jobs	Direct Jobs	
SURFACE TRANSPORTATION			
Rail	478	657	-178
Truck	3,394	3,610	-215
MARITIME SERVICES			
Terminal	1,569	1,772	-203
ILA	1,648	2,151	-503
Tug Assist/Barge	120	112	8
Pilots	126	75	51
Agents	77	148	-71
Maritime Services/Construction	762	1,667	-905
Freight Forwarders	260	307	-47
Warehouse	803	1,105	-302
Government	1,115	1,327	-213
MARYLAND PORT ADMINISTRATION	215	294	-79
DEPENDENT SHIPPERS/CONSIGNEES	3,840	3,269	571
TOTAL	14,407	16,493	-2,085

Totals may not add due to rounding.

Table V-6 shows the comparison of direct jobs by commodity. This exhibit shows the largest growth in direct jobs is associated with containerized cargo. Despite the fact that actual containerized cargo throughput has remained nearly equal to the 2006 level, the growth in jobs is due to the fact that more than 500 jobs with shippers/consignees are now directly dependent upon the Port for the shipment and receipt of containerized cargo, and secondly, the hinterland of containerized cargo has increased, as the Port has been able to increase its market reach into the Mid-western states, such as the key distribution hubs located in Columbus and Southwestern and South Central Pennsylvania. As a result, the distribution impact of containerized cargo has increased since 2006. Finally, with the development of the concession with Ports America Chesapeake at Seagirt Marine Terminal, the terminal employment has increased.

Exhibit V-6
Comparison of Direct Employment Impact

	2010	2006	Change
	Direct Jobs	Direct Jobs	Direct Job
Containers	3,515	2,478	1,036
Steel Products	740	112	628
RoRo	443	505	-62
Lumber	41	88	-47
Paper	202	378	-177
Pulp	239	140	99
Break Bulk	734	2,358	-1,623
Automobiles	1,087	1,157	-70
Coal	1,312	1,527	-216
Other Dry Bulk	1,854	2,044	-191
Iron Ore	1,647	1,832	-185
Petroleum	486	611	-125
Other Liquid Bulk	103	275	-172
Not Allocated	<u>2,006</u>	<u>2,986</u>	<u>-980</u>
Total	14,407	16,493	-2,085

The largest declines in direct jobs are concentrated with break bulk cargo, reflecting the contraction of this cargo market since 2006, and the loss of 980 jobs in the non-allocated category, which reflects the loss of shipyard and ship repair activity at the Port of Baltimore.

4. SUMMARY OF IMPACT COMPARISONS

The economic recession has had a significant impact on the cargo activity at the Port of Baltimore, particularly with respect to the loss in break bulk cargo, paper, iron ore, petroleum and other liquid bulk. However, despite the recession, the Maryland Port Administration has been able to grow its pulp and auto business over 2006 levels, and furthermore has been able to maintain its container throughput and increase its market area, thereby growing jobs in the state's economy. In light of the loss of tonnage attributed to the recession, the public and private marine terminals at the Port of Baltimore continue to be a significant economic engine in the Baltimore region, supporting more than 40,000 jobs in the State's economy, and the port's facilities are well positioned to handle the increased tonnage anticipated as the economic recovery continues. Furthermore, the importance of the marine terminals to the state is underscored by the fact that the more than 200,000 employees in the state of Maryland were involved with cargo moving via the terminals in 2010, and the Port has been able to maintain its level of containerized cargo business during the recession.